

3

Watershed Recommendations

In order to achieve each of the three overarching Watershed Goals, a list of 17 Strategic Actions has been developed. This list was compiled from a review of the types of recommended actions previously included in the approved watershed plans for Powhatan Creek and Yarmouth Creek. Recommendations were tailored based on an understanding of the living resources and land use practices specific to the Gordon Creek watershed as well as knowledge of the status of JCC's baseline mapping and planning tools. JCC staff from across the organization collaborated on the development and refinement of the Strategic Actions. This process ensured input from a broad pool of individuals having knowledge and experience in different disciplines and thus made certain all aspects of watershed management planning were addressed.

The list of three Watershed Goals and cross-referenced Strategic Actions are provided in Table 3-1 and discussed below in terms of seven of the eight tools of watershed protection developed by the CWP (CWP 1998), which are:

- Land Use Planning;
- Better Site Design (BSD);
- Aquatic Buffers;
- Conservation Areas;
- Watershed Education And Stewardship Programs;
- Stormwater Treatment Practices; and
- Non Stormwater Discharges

One tool of watershed protection was omitted: Erosion and Sediment Control since it is already regulated by JCC and the State. The Strategic Actions in Table 3-1 are ranked in terms of priority, based on public comment.



This Page Intentionally Left Blank



TABLE 3-1. GORDON CREEK WATERSHED PROTECTION AND RESTORATION GOALS AND RECOMMENDATIONS FOR GOAL REALIZATION

a. Watershed-Wide Protection and Restoration Goals

Goal	Description
1	Minimize the further degradation of water quality in Gordon Creek and preserve, restore and maintain the outstanding quality of all streams within the watershed as well as tidal and nontidal wetlands.
2	Develop in a manner that is consistent with the protection of living resources in the Gordon Creek watershed: avoid habitat fragmentation and encourage the preservation of riparian and wildlife corridors.
3	Promote active stewardship among residents, community associations, businesses, and seasonal visitors.

b. Strategic Actions for Watershed Protection and Restoration and Estimated Costs

Priority	Goals	Strategic Action	Watershed Location	Cost to County and Action	Coordinating Parties
1	1,2	Provide incentives for new development to add intermittent stream buffers, expanded RPA and mainstem buffers, preserve identified conservation areas, minimize impervious cover, and maximize contiguous open space.	watershed wide & County wide	HIGH: >\$200K	ED, PD, DM
2	1,2	Identify areas within the watershed where riparian corridors have been damaged, disturbed or are in an unnatural condition and seek ways, including incentives, to restore those areas to their natural condition.	watershed wide & County wide	MODERATE: \$15-25K	DM, ED, SD, GS, GIS, SH
3	1	Implement Special Stormwater Criteria for all new plans for development (except those with approved plans or in review)	watershed wide	SMALL: program ongoing	DM, ED, PD
4	ALL	Promote the Purchase of Development Rights (PDR) program funds for special resource areas (e.g., riparian buffers and conservation areas).	watershed wide	HIGH: \$1M+ / year	DM, PDR, SH
5	2,3	Identify key stakeholders within the watershed (landowners, schools, etc.) that can help implement watershed planning objectives. Work with them to develop a shared vision for preserving natural resources through community actions and provide opportunities for them to contribute to the attainment of watershed management goals.	watershed wide	SMALL: explore academic/volunteer consulting input	ED, PD, SD, SH, outside consultants / agencies
6	1,3	Continue to fully implement the requirements of the County's MS4 and solid waste management permits in relation to watershed management throughout County.	watershed wide & County wide	SMALL: already underway	ED, SD, GS, JCSA, GIS, WJCCS
7	1	Update or develop new Better Site Design (BSD) educational materials to be made available to developers and homeowner's associations and conduct training.	watershed wide	SMALL: largely internal coordination	DM, ED, PD

Key: DM = Development Management, ED = Environmental Division, GIS = GIS/Mapping Section, GS = General Services, JCSA = James City Service Authority
 PD = Planning Department, PDR = Purchase of Development Program, P&R = parks and recreation, SD = Stormwater Division, SH = stakeholders, WJCCS = schools



TABLE 3-1. GORDON CREEK WATERSHED PROTECTION AND RESTORATION GOALS AND RECOMMENDATIONS FOR GOAL REALIZATION

a. Watershed-Wide Protection and Restoration Goals

Goal	Description
1	Minimize the further degradation of water quality in Gordon Creek and preserve, restore and maintain the outstanding quality of all streams within the watershed as well as tidal and nontidal wetlands.
2	Develop in a manner that is consistent with the protection of living resources in the Gordon Creek watershed: avoid habitat fragmentation and encourage the preservation of riparian and wildlife corridors.
3	Promote active stewardship among residents, community associations, businesses, and seasonal visitors.

b. Strategic Actions for Watershed Protection and Restoration and Estimated Costs

Priority	Goals	Strategic Action	Watershed Location	Cost to County and Action	Coordinating Parties
8	1	Continue to work with County departments to incorporate BSD requirements into applicable ordinances and into the County BMP Manual, and to develop consistent review procedures.	watershed wide	SMALL: largely internal coordination	DM, ED, PD
9	ALL	Work with private landowner(s) to develop feasibility plans for the dams at Jolly Pond and Warburton Pond, including but not limited to evaluating potential funding sources for the repair, monitoring and maintenance of the dams and associated roadways, assessment for archaeological resources, potential impacts to archaeological and environmental resources and public health and safety associated with either dam failure or purposeful decommissioning, and options for restoration of the former stream channel and bottomlands.	all subwatersheds except 202 (tidal mainstem)	MODERATE: \$30-60K ea.	DM, ED, PD, SD, SH, outside consultants / agencies
10	ALL	Use subwatershed maps to ensure James City County staff and stakeholder awareness of existing locations for restoration and potential conservation areas.	watershed wide	SMALL: internal coordination	ED, DM, GIS, PD, SD, GS
11	3	Continue to support and grow a citizen/volunteer-based team of individuals to routinely perform assessments of stream health, including sampling for benthic macroinvertebrates, water quality indicators, and photodocumentation.	watershed wide	SMALL: already underway	SD, SH, outside consultants / agencies
12	3	Improve the availability of educational materials by including watershed information as part of the Freedom Park environmental / interpretive area. Also use the PRIDE website. Educate people about watershed awareness including chemical disposal, pet waste, onsite waste disposal systems, rubbish, and boat wakes.	watershed wide	MODERATE: \$15-25K	ED, P&R, SD, SH

Key: DM = Development Management, ED = Environmental Division, GIS = GIS/Mapping Section, GS = General Services, JCSA = James City Service Authority
 PD = Planning Department, PDR = Purchase of Development Program, P&R = parks and recreation, SD = Stormwater Division, SH = stakeholders, WJCCS = schools



TABLE 3-1. GORDON CREEK WATERSHED PROTECTION AND RESTORATION GOALS AND RECOMMENDATIONS FOR GOAL REALIZATION

a. Watershed-Wide Protection and Restoration Goals

Goal	Description
1	Minimize the further degradation of water quality in Gordon Creek and preserve, restore and maintain the outstanding quality of all streams within the watershed as well as tidal and nontidal wetlands.
2	Develop in a manner that is consistent with the protection of living resources in the Gordon Creek watershed: avoid habitat fragmentation and encourage the preservation of riparian and wildlife corridors.
3	Promote active stewardship among residents, community associations, businesses, and seasonal visitors.

b. Strategic Actions for Watershed Protection and Restoration and Estimated Costs

Priority	Goals	Strategic Action	Watershed Location	Cost to County and Action	Coordinating Parties
13	1	Conduct additional feasibility assessments, validate, and carry out the stormwater retrofits and stream restorations identified in this watershed plan	101, 105, 106, 202	MODERATE: \$75-150K ea.	DM, ED, SD
14	ALL	Continue to utilize available regional / state / federal data in the County GIS database, including but not limited to data from the DHR-DSS, DCR-DNH and DGIF to: a) assist in prioritizing conservation areas; b) ensure that potential development opportunities fully appreciate the cultural and natural resources within the footprint; and c) be sensitive to potential resources when and where any emergency action is needed.	watershed wide & County wide	SMALL: if data available for exchange from State agencies	GIS, PD, outside agencies
15	3	Enhance the stewardship of Gordon Creek by specifically addressing litter and shoreline erosion from boat wake issues	202	SMALL: use stakeholder meetings for insight	SD, GS, SH, outside agencies
16	ALL	Consider participation in the Virginia Big Tree or similar recognition program to identify historic and specimen trees and promote the importance of trees to the landscape	watershed wide & County wide	SMALL: explore academic/volunteer consulting input	DM, ED, SD, GS, GIS, SH
17	1	Develop an inter-departmental rapid response protocol and team to deal with unforeseen and emergency threats to water quality and infrastructure (e.g., leaking sewer lines, storm-related or unpredictable channel and bank erosion, hazmat spills, etc.)	watershed wide & County wide	SMALL: largely internal coordination	DM, ED, GIS, JCSA, SD, GS, WJCCS, P&R

Key: DM = Development Management, ED = Environmental Division, GIS = GIS/Mapping Section, GS = General Services, JCSA = James City Service Authority
 PD = Planning Department, PDR = Purchase of Development Program, P&R = parks and recreation, SD = Stormwater Division, SH = stakeholders, WJCCS = schools

3.1 Land Use Planning

The relatively undeveloped status of the Gordon Creek watershed and the need for responsible development therein is the impetus for prioritizing this watershed management plan and underpins all of the Watershed Goals. Purposeful and informed land use planning is critical to achieve these goals.

Priority #10 - Strategic Action: *Use of subwatershed maps to ensure James City County staff and stakeholder awareness of existing locations for restoration and potential conservation areas.*

The recommendations arising out of the CWP's *Baseline Assessment and Conservation Area Plan* and the associated mapping will provide the basis to manage resources at a subwatershed scale, share information using standardized maps, evaluate land development plans, and identify watershed restoration areas. These maps should be made available to stakeholders and the public so that land use planning can proceed in the most informed way possible.

While the *Baseline Assessment and Conservation Area Report* provides valuable background information on the natural resources within the watershed, JCC can improve base mapping and by extension land use planning by executing the following Strategic Action:

Priority #14 - Strategic Action: *Continue to utilize available regional / state / federal data in the County GIS database , including but not limited to data from the Department of Historic Resources Database Sharing System (DHR-DSS), DCR's Natural Heritage Data Explorer, and Department of Game and Inland Fisheries Fish and Wildlife Information Service to: a) assist in prioritizing conservation areas; b) ensure that potential development opportunities fully appreciate the cultural and natural resources within the footprint; and c) be sensitive to potential resources when and where any emergency action is needed.*

While the *Baseline Assessment* included recommendations to enhance riparian buffer widths along the Gordon Creek mainstem, no new requirements are being recommended within this watershed management plan. Rather, JCC prefers to incentivize buffer establishment or enhancement for new development, as well as the preservation of conservation areas (see Appendix C). Such areas would only include those not already subject to regulatory protection of some kind (e.g., Chesapeake Bay Protection Areas and their buffers). Similarly, incentives could also be sought for the restoration of previously disturbed areas. Two Strategic Actions are included to address such an approach:

Priority #1 - Strategic Action: *Provide incentives for new development and redevelopment to add intermittent stream buffers, expanded RPA and mainstem buffers, preserve identified conservation areas, minimize impervious cover, and maximize contiguous open space.*

Priority #2 - Strategic Action: *Identify areas within the watershed where riparian corridors are in an unnatural condition and seek ways, including incentives, to restore those areas to their natural condition*

While the CWP made every effort to identify appropriate conservation areas within the Gordon Creek watershed within the *Baseline Assessment and Conservation Area Report*, they were not tasked



with performing an exhaustive ground survey of forest conditions. CWP did make observations of specimen trees and areas of old growth forest. In 1970, the 4-H and Future Farmers of America initiated the Virginia Big Tree Program, aimed at locating and recognizing the importance of large, specimen trees in the landscape. This program continues at present, and may provide an educational opportunity that can introduce potential stewards to the breadth of their watershed. Moreover, the search for and identification of big trees may promote the recognition of the value of forests in the landscape and the importance of sustainable forestry practices.

In keeping with the conservation minded recommendations discussed above, the following Strategic Action is included with respect to the Virginia Big Tree Program:

Priority #16 - Strategic Action: *Consider participation in the Virginia Big Tree or similar recognition program to identify historic and specimen trees and promote the importance of trees to the landscape.*

3.2 Better Site Design (BSD)

Better Site Design (BSD) is a development technique used to maintain existing hydrology, preserve contiguous open space, and minimize impacts from impervious surfaces. The local Site Planning Roundtable in JCC is modeled after the National Site Planning Roundtable, the 22 Model Development Principles, and four basic objectives:

- Reduce overall site impervious cover
- Preserve and enhance existing natural areas
- Integrate stormwater management
- Retain a marketable product

The JCC Local Site Planning Roundtable was established to review existing development codes and identify regulatory barriers to environmentally sensitive residential and commercial development at the site level. The Roundtable recommendations include suggested general and specific code and ordinance revisions that will increase flexibility for site design standards and promote the use of open space and flexible design development in JCC (JCC 2007a). This process was focused on model development principles at the site level and did not include discussions on zoning or land use.

Better Site Design in James City County: Report and Findings from the Better Site Design Implementation Committee, dated September 2007, summarizes the 24 model principles and the Committee's proposed implementation recommendations. The Committee noted that knowledge of BSD principles and techniques varies among JCC staff, legislators, and planners/engineers within the development community. This inconsistency and lack of knowledge and training is a major hurdle in implementing the BSD principles. Opportunities are lost during the design review process if staff or legislators do not request inclusion of BSD features in a development plan. The Committee recommended that JCC conduct a one-day internal BSD training seminar to educate staff, Planning Commissioners, and the Board of Supervisors. This internal seminar should be

lead by an outside consultant to train attendees on the benefits of BSD; how to encourage applicants, early in the design and approval process, to apply BSD techniques; and how to respond to typical misconceptions associated with BSD techniques. (JCC 2007a)

Many of the principles have been implemented already, but the following items are still pending:

- Develop a BSD checklist;
- Incorporate BMP manual revisions for Low Impact Development (LID) and BSD elements;
- Consider ordinance changes (Cluster Ordinance) and policy development regarding street widths; and
- Develop or continue using a variety of educational materials.

Considering the preceding points, the following Strategic Actions regarding BSD are included:

Priority #7 - Strategic Action: Update or develop new BSD educational materials to be made available to developers and homeowner's associations and conduct training.

JCC realizes that the responsibility for the implementation of BSD cannot necessarily lie solely with developers and their engineers, and that JCC must be proactive about staying abreast of current technology and methods and trends in BSD. They have recognized that internal training is also necessary to ensure staff members in various government divisions are familiar with BSD tenets and applications and that they recognize the importance of BSD in watershed protection, especially early in the site design process. Once a site is developed with BSD, the property owner takes over responsibility for maintenance of the systems. Often, homeowners, business owners and owner associations do not understand how to best maintain infiltration measures.

Priority #3 - Strategic Action: Implement Special Stormwater Criteria for all new plans for development (except those with approved plans or in review).

Priority #8 - Strategic Action: Continue to work with County departments to incorporate Better Site Design (BSD) requirements into applicable ordinances and into the County BMP Manual, and to develop consistent review procedures.

Given the undeveloped nature of the Gordon Creek watershed, there is ample opportunity to apply BSD practices to new development. BSD practices, such as limiting or disconnecting impervious areas, are incorporated into the Special Stormwater Criteria (SSC) implemented by JCC in December 2004. SSC provides additional stormwater criteria above the 10-point water quality requirement, and stream channel protection criteria to preserve pre-development hydrology to reduce impacts to high quality streams and to provide enhanced water quality treatment of stormwater runoff.

3.3 Aquatic Buffers

After the 2004 revisions to JCC Code, Chapter 23, Chesapeake Bay Preservation, the JCC Environmental Division took steps to revise existing County RPAs accordingly. RPA boundaries were modified where necessary based on the location of known perennial streams, topographic



map and airphoto interpretation, site visits, and National Wetlands Inventory (NWI) mapping. These new RPA boundaries are subject to review and revision with the submittal of a plan of development.

In June 2007, the DCR released a guidance publication entitled *Resource Protection Areas: Nontidal Wetlands* (revised December, 2007). The purpose of this document was to clarify long-standing uncertainties in the interpretation of state regulations with respect to the designation of RPAs based on perennial flow determinations and the connectivity of contiguous wetlands by surface flow. The DCR's stance as suggested in the guidance and expressed by their technical staff (N. Hughes, personal communication, 2008) is that in simple terms, contiguity equates with connection by surface flow.

A relatively localized issue regarding aquatic habitat was raised during the first stakeholder meeting and remains a topic of concern for landowners and residents in the Gordon Creek watershed. As of Monday, February 2, 2010, the Virginia Department of Transportation (VDOT) permanently closed vehicular access to that part of Jolly Pond Road crossing Jolly Pond Dam to "ensure the safety of the travelling public" (VDOT 2010). Jolly Pond Dam suffered localized but appreciable failure following tropical storm Ernesto in October of 2006 and has not been repaired in a manner sufficient to address VDOT standards and DCR requirements for dam safety. A JCC Board of Supervisors resolution dated February 27, 2007 recognized the importance of Jolly Pond Road to the landowners in the Gordon Creek watershed, acknowledging that previous road closures in advance of dam repair caused "increased response times for fire, rescue, and police personnel in the event of an emergency" and has "been a significant inconvenience to citizens" (JCC 2007b).

Jolly Pond provides a variety of benefits for the Gordon Creek watershed. As a long-established impoundment (construction occurred ca. 1730), swampy areas of bald cypress trees fringe the pool. A variety of aquatic habitats are present for waterfowl and amphibians. Jolly Pond also represents a scenic resource and the dam site itself has been recognized as one of Virginia's most endangered historic sites by the Association for the Preservation of Virginia Antiquities (APVA 2008). For these reasons, assisting with the resolution of the issue of the failing Jolly Pond dam has been made a Strategic Action for watershed management.

Priority # 9 - Strategic Action: *Work with private landowner(s) to develop feasibility plans for the dams at Jolly Pond and Warburton Pond, including but not limited to evaluating potential funding sources for the repair, monitoring and maintenance of the dams and associated roadways, assessment for archaeological resources, potential impacts to archaeological and environmental resources and public health and safety associated with either dam failure or purposeful decommissioning, and options for restoration of the former stream channel and bottomlands.*

Unexpected failures of road surfaces and embankments, stormwater management facilities, and sanitary sewer lines can occur in response to major storm events, transportation accidents, or inadequate monitoring and maintenance. Such failures can have dramatic and cascading effects of stream and wetland health, including stream channel and bank erosion, excessive sediment deposition and associated habitat loss, downstream transportation of bacteriological hazards or

other hazardous materials. These impacts, along with the potential loss of infrastructure, are compounded if the problem is not quickly identified and addressed and responsible parties held accountable for reparations to failed facilities and the restoration of affected natural resources. For this reason, the following Strategic Action has been included:

Priority # 17 - Strategic Action: *Develop an inter-departmental rapid response protocol and team to deal with unforeseen and emergency threats to water quality and infrastructure (e.g., leaking sewer lines, storm-related or unpredictable channel and bank erosion, hazmat spills, etc.)*

3.4 Conservation Areas

Additional watershed management recommendations include utilization of the Purchase of Development Rights (PDR) program to support conservation areas identified in this draft watershed plan. JCC should play an active role in facilitating discussions between stakeholders and strategic partners such as the Williamsburg Land Conservancy, The Nature Conservancy, Virginia Outdoors Foundation, and the James River Association.

Priority #4 - Strategic Action: *Promote the Purchase of Development Rights (PDR) program with regards to special resource areas (e.g., buffers and conservation areas), working with the stakeholder watershed group to identify and conserve these lands.*

3.5 Watershed Education and Stewardship Programs

Priority #12 - Strategic Action: *Improve the availability of environmental education materials in general and specifically by including watershed information as part of a Freedom Park environmental interpretive area. Also use the existing PRIDE website for this purpose. Materials will assist in educating people about watershed awareness including chemical disposal, pet waste, onsite waste disposal systems, rubbish, and boat wakes.*

Providing educational materials and a venue for their display at a future environmental interpretive area at Freedom Park would provide a sense of the importance of water quality issues to the overall environmental health within not only the Gordon Creek watershed but throughout JCC. There are a variety of reasons why the development and display of watershed educational materials at Freedom Park could be particularly successful. These include:

- Promoting the prevention of water quality degradation on the “front end” of land development projects, rather than relying on retrofits to address problem areas. Examples of instabilities in headwater streams in the neighboring and slightly more developed Yarmouth Creek watershed could be used as counterpoints.
- Providing land owners and residents with the knowledge they need to make environmentally responsible decisions and be proactive about maintaining the favorable condition of the Gordon Creek watershed.



- Promoting feelings of ownership and responsibility for local sensitive resources.
- Located near the geographic center of the watershed, Freedom Park represents an ideal marshalling point for interested citizens, potential volunteers, and educators. A variety of interpretative opportunities are located within the park boundaries, including:
 - treatment of parking lot runoff via the existing grassy swale provides an example of a functioning, alternative approach to stormwater management (see Site GC-05, Table 1-2);
 - the use of road-side swales along the entire access road from Centerville Road;
 - pristine sand bed streams in close proximity to existing hiking trails, and relatively easy access to other streams in the watershed from this centralized location;
 - a viewing location for emergent and scrub-shrub wetlands upstream and downstream of the beaver dam and proposed utility crossing at Colby Swamp (Site GC-10, Table 1-2); and
 - the possibility of engaging students from nearby J. Blaine Blayton Elementary and Lois Hornsby Middle Schools in environmental educational programs, with potential access to Freedom Park along a shared utility easement/walking path crossing over the beaver dam at Colby Swamp.
- Similar programs are typically inexpensive, yet can have far reaching benefits. Volunteers can be gathered from pools of not only stakeholders, but local academic institutions, state and federal agencies, environmental consulting firms, and non-profit conservation organizations.

Freedom Park can also provide a venue for informational and interpretive signage detailing the benefits of stormwater BMPs and maintaining adequate riparian buffers. Other aspects of water quality preservation may include educational information within the park regarding cleaning up after your pets. As Freedom Park appears to be a popular dog walking location, JCC could install interpretive signage at the parking lot highlighting the importance of proper disposal of fecal waste from dogs. Providing the residents of Gordon Creek watershed with a hands-on experience in the use of BMPs to improve and maintain water quality can be a very effective educational tool.

Specific areas to be addressed through a stewardship and education program should include: preferred practices for lawn and garden care, invasive species management/control, pet waste disposal, environmentally sensitive car maintenance practices, septic system inspections and repair when necessary, and the proper disposal of household hazardous wastes. Many riparian buffer areas within the watershed are located on private property and are often subject to encroachment, homeowners should be educated on the benefits of maintaining undisturbed, vegetated buffers along stream and wetland areas.

Specific actions that JCC can take to maximize the potential success of a stewardship and education program within the Gordon Creek watershed include:

- support and help promote volunteer stream clean-up efforts;

- utilize existing communication tools for the residents of the watershed to distribute educational materials on actions residents can take to protect their water resources;
- provide workshops for residents to showcase on-going restoration projects, BMP examples, and daily practices they can implement to protect water quality – Freedom Park may offer an ideal location for such activities;
- include schools within the watershed in these volunteer-based programs, providing information and materials for teachers to include water quality protection measures in their curriculum; and
- support volunteer water quality monitoring efforts (both for baseline data collection and in areas of concern).

A specific Strategic Action has been added with respect to this last point:

Priority #11 - Strategic Action: *Continue to support and grow a citizen/volunteer-based team of individuals to routinely perform assessments of stream health, including sampling for benthic macroinvertebrates, water quality indicators, and photodocumentation.*

Stakeholders in the Gordon Creek watershed have expressed concerns regarding water quality, especially downstream of the former Jolly Pond landfill (see Appendix B). JCC is currently carrying out quarterly sampling for benthic macroinvertebrates at select locations near the Jack L. Massie Contractor Inc. Mineral Resource Area using the Virginia Save Our Streams methodology, in accordance with the Virginia Citizen Water Quality Monitoring Program Methods Manual, VDEQ October 2007. With the help of a trained group of individuals, monitoring activities could be expanded not only in geographic extent but in the degree of data collection. By continuing and exploring teaming relationships with personnel from the College of William & Mary, Keck Environmental Field Laboratory and local environmental firms, citizen volunteers can be readily armed with the training necessary to perform water quality analysis for fundamental parameters (e.g., pH, dissolved oxygen, conductivity, and turbidity) and to perform stream walk surveys to identify and document potential sources of stormwater and other pollution.

Performing routine assessments of stream health offers multiple benefits, including:

- providing baseline information against which future studies can be compared, offering the ability to link trends in water quality improvement / decline to activities in the contributing subwatershed;
- assisting JCC in developing Total Maximum Daily Load implementation plans;
- identifying areas needing further assessment for restoration or for upgraded stormwater facilities and
- educating the public with respect to wildlife habitat and biodiversity, stream health, vectors for water quality degradation, and the importance of watershed stewardship.



This Strategic Action also provides opportunities for educational training beyond stream assessment and monitoring techniques. It could be tailored toward mindfulness of existing land uses and their implications, conservation of sensitive resources, and evaluation and documentation of potential sources of pollution/water quality degradation. Some important subjects for program exploration and opportunities for involvement may involve the following:

- runoff from agricultural land use and the need for conservation planning;
- stormwater associated with impervious surfaces;
- erosion and sedimentation control practices for on-going land disturbance and development;
- eroding streambanks and/or degraded channels;
- failing infrastructure or private septic systems;
- riparian buffers;
- Virginia Big Tree Program
- Silvicultural practices; and
- biological monitoring.

The continued promotion of watershed education would also provide residents with a voice in County decision making processes concerning development within their watershed. Providing landowners with adequate information regarding the role they can play in protecting their aquatic resources can potentially offset the level of effort required by JCC in the form of stormwater retrofits and BMP maintenance.

Priority #5 - Strategic Action: *Identify key stakeholders within the watershed (landowners, schools, etc.) that can help implement watershed planning objectives. Work with them to develop a shared vision for preserving natural resources through community actions and provide opportunities for them to contribute to the attainment of watershed management goals.*

Although this can be viewed as a larger, County-wide Strategic Action, Gordon Creek offers some unique opportunities for key stakeholder involvement. Specifically, administration at the new combined school site off Jolly Pond road may very well be interested in a watershed education and/or stewardship opportunity. The schools' proximity to Freedom Park is particularly advantageous. The Keck Lab at the College of William and Mary has done extensive work in other local watersheds and have been approached informally about participating in educational and fieldwork opportunities in the Gordon Creek watershed. Preliminary coordination has been very favorable, with members of the Keck Lab excited about the possibilities for academic research and to help foster watershed stewardship.

Of course, as a primary landowner in the Gordon Creek watershed, JCC is particularly cognizant of its obligation and responsibility in watershed stewardship and the importance of setting a good example with regards to responsible land planning.

Priority #15 - Strategic Action: *Enhance the stewardship of Gordon Creek by specifically addressing litter and shoreline erosion from boat wake issues.*

Isolated instances of dumping were observed during the field effort for the *Baseline Assessment and Conservation Area Plan*. These areas could be addressed via a JCC or stakeholder-organized and volunteer driven watershed clean-up day, and the event used as an opportunity to educate participants about watershed protection and to distribute educational materials and provide contact information to bolster citizen involvement.

Though the CWP did not identify boat wake erosion as a concern within the *Baseline Assessment*, it has been noted as an issue in the neighboring Yarmouth Creek watershed and downstream of the confluence of Gordon Creek with the Chickahominy River at Chickahominy Riverfront Park. The tidal portions of Gordon Creek will likely experience an increase in recreational boat traffic in the coming years. Therefore, like many of the Strategic Actions discussed thus far, proactive vigilance is required.

3.6 Stormwater Treatment Practices

A detailed discussion of Strategic Actions with respect to stormwater treatment practices is provided in the following Chapter 4, *Stormwater Master Plan*, specifically Section 4.5.2. The three Strategic Actions related to stormwater treatment practices are:

Priority #3 - Strategic Action: *Require application of Special Stormwater Criteria for all new plans for development (except those with approved plans or in review).*

Priority #13 - Strategic Action: *Conduct additional feasibility assessments, validate, and carry out the five (5) stormwater retrofits identified in this watershed plan.*

Priority #6 - Strategic Action: *Continue to fully implement the requirements of the County's MS4 and solid waste management permits in relation to watershed management throughout the County.*

3.7 Non Stormwater Discharges

Priority #6 - Strategic Action: *Continue to fully implement the requirements of the County's MS4 and solid waste management permits in relation to watershed management throughout the County.*

The James City County Sanitary Landfill boundary encompasses approximately 313 acres, of which 126 acres are permitted for waste. However, the actual limits of waste encompass only 77 acres. Given the nature of the landfill, JCC has installed an extensive groundwater monitoring network consisting of 13 monitoring wells. Each well is monitored on a semi-annual basis in accordance with the Virginia Solid Waste Management Regulations (VSWMR).



In the past, several wells exceeded Groundwater Protection Standards (GPS) and JCC prepared a Corrective Action Monitoring Plan (CAMP) to address the affected groundwater (see Appendix D). The extent of constituents exceeding their GPS is limited to within County property. The CAP has been approved by the DEQ and relies on natural attenuation to remediate the constituents exceeding GPS. An additional 14 monitoring wells were installed in 2009 to monitor the effectiveness of natural attenuation. Monitoring will begin following amendment of the facility's permit by the DEQ. Monitoring wells have been located to intercept constituents should they migrate toward surface water. A surface water monitoring plan will be developed should this occur.

In 2002, a water well owned by the adjacent Hunt Club was sampled and two organic compounds, trichloroethene and vinyl chloride, were detected above the GPS. The County replaced the well soon thereafter and no issue has been brought up since then.

Regarding impacts surface waters, the County has not reported surface water impacts to the DEQ. If constituents are detected in wells during natural attenuation monitoring that suggest a threat to surface water, samples will be collected and a surface water mitigation plan will be developed, if necessary.